

User's Guide

AHA-2940*Ultra* / 2940*Ultra* Wide
PCI-to-*Ultra*SCSI Host Adapter
with SCSI*Select*

◆◆◆◆ AHA-2940Ultra/
2940Ultra Wide
PCI-to-UltraSCSI Host Adapter
with SCSISelect

User's Guide

 adaptec

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FCC Compliance Statement

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference in residential installations. This equipment generates, uses, and can radiate radio frequency energy, and if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation.

If this equipment does cause interference to radio or television equipment reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna
- Move the equipment away from the receiver
- Plug the equipment into an outlet on a circuit different from that to which the receiver is powered
- If necessary, the user should consult the dealer or an experienced radio/television technician for additional suggestions

CAUTION: Only equipment certified to comply with Class B (computer input/output devices, terminals, printers, etc.) should be attached to this equipment, and must have shielded interface cables.

Finally, any changes or modifications to the equipment by the user not expressly approved by the grantee or manufacturer could void the user's authority to operate such equipment.

Each host adapter is equipped with an FCC compliance label that shows only the FCC identification number. The full text of the associated label follows:

This device complies with part 15 of the FCC rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference and (2) this device must accept any interference received, including interference that may cause undesired operation.

▼▼▼ Contents

1 Installation and Setup

Installing the Host Adapter 1-3

SCSI Configuration Guidelines 1-4

SCSI ID Numbers 1-4

SCSI Terminators 1-5

Installing SCSI Devices 1-9

Choosing SCSI Cables 1-9

Connecting Internal SCSI Devices 1-10

Connecting External SCSI Devices 1-11

Using the LED Connector 1-12

Reassembling the Computer 1-12

2 Configuration

Configuring the Computer 2-1

Configuring the Host Adapter 2-2

SCSISelect Default Settings 2-2

Starting the SCSISelect Utility 2-10

Using the SCSI Disk Utilities 2-10

Installing Device Drivers 2-11

3 Advanced Setups and Configurations

Configuring Multiple Host Adapters 3-1

A Need Assistance?

Troubleshooting A-1

Other Problems and Solutions A-2

BIOS Startup Messages A-3

Adaptec Customer Support A-4

Index



Installation and Setup

The Adaptec AHA[®]-2940Ultra and AHA-2940Ultra Wide PCI-to-UltraSCSI host adapters provide a powerful multitasking interface between your computer's PCI bus and SCSI devices (disk drives, CD-ROM drives, scanners, tape backups, removable media drives, etc.). Up to a total of seven SCSI devices can be connected to the internal or external SCSI connector on the AHA-2940Ultra, and up to 15 devices to the AHA-2940Ultra Wide. Collectively, both host adapters are referred to as the AHA-2940Ultra/2940Ultra Wide. Figure 1-1 shows the major components on the AHA-2940Ultra, and Figure 1-2 shows the components on the AHA-2940Ultra Wide.

If you need to configure the AHA-2940Ultra/2940Ultra Wide, the onboard SCSISelect[™] configuration utility allows you to change host adapter settings without opening the computer or handling the board. The SCSISelect utility also contains a utility to low-level format and verify the disk media on your hard disk drives.

This user's guide is a companion to the installation guide for the AHA-2940Ultra/2940Ultra Wide. Both guides discuss the same topics—installing and configuring the AHA-2940Ultra/2940Ultra Wide—but the user's guide provides more detailed instructions. If you have installed SCSI devices before, you will probably find it faster to use the installation guide (you can always refer to the user's guide if you have questions). Beginning users may prefer to use the more detailed instructions in this user's guide.

Installing the Host Adapter

Follow these instructions to install the host adapter:



Note: Always refer to your computer documentation for any special instructions on installing expansion cards such as the AHA-2940Ultra / 2940Ultra Wide.

- 1 Turn OFF power to the computer and peripheral devices and disconnect the power cords.
- 2 Remove the cover from the computer case.
- 3 Locate an unused 32-bit PCI expansion slot (the slot must support Bus Master data transfers); unscrew and remove the metal bracket that covers the card-slot opening. (Save the screw to use when securing the host adapter in your computer.)
- 4 Insert the host adapter in the PCI expansion slot. Press it down firmly so that the contacts are securely seated in the slot.
- 5 When the host adapter is firmly seated in the expansion slot, secure the metal bracket of the host adapter with the screw you removed in step 3.

Do not replace the computer cover or reconnect your computer and peripherals to their power sources yet!

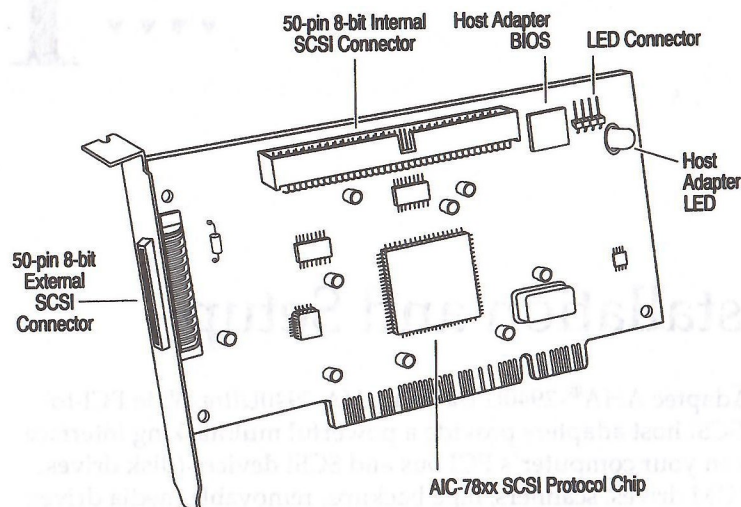


Figure 1-1. AHA-2940Ultra Layout

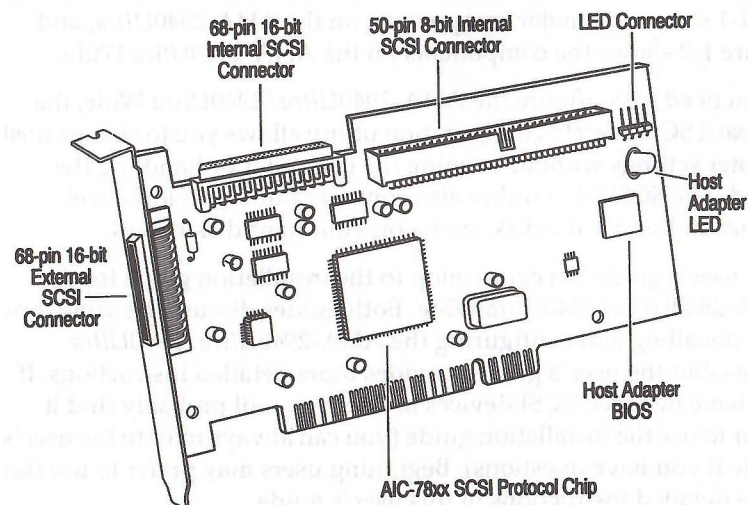


Figure 1-2. AHA-2940Ultra Wide Layout

SCSI Configuration Guidelines

Before installing your SCSI devices, you should understand the basic SCSI concepts described in this section. The information will help you set up your host adapter and devices so they function properly.

SCSI ID Numbers

Each device attached to the host adapter, as well as the host adapter itself, must have a unique SCSI ID number (0 to 7 for the AHA-2940Ultra, and 0 to 15 for the AHA-2940Ultra Wide). The SCSI ID serves two purposes:

- It uniquely defines each SCSI device on the SCSI bus.
- It determines the device's priority on the SCSI bus.

For SCSI devices connected to the AHA-2940Ultra, SCSI ID 7 has the highest priority, and SCSI ID 0 has the lowest. For devices connected to the AHA-2940Ultra Wide, SCSI ID 7 also has the highest priority. The priority of the remaining IDs, in descending order, is 6 to 0 and 15 to 8.



Note: SCSI IDs play no role in determining the order in which devices are cabled to the host adapter.

We recommend that you leave the AHA-2940Ultra/2940Ultra Wide set to its default setting of SCSI ID 7. If for some reason you need to change the AHA-2940Ultra/2940Ultra Wide SCSI ID, see *Configuring the Host Adapter* on page 2-2. To change the SCSI ID on your hard disk and other SCSI devices, refer to the device's documentation.

The AHA-2940Ultra/2940Ultra Wide supports the SCSI Configured AutoMatically (SCAM) protocol, which assigns SCSI IDs dynamically and resolves SCSI ID conflicts automatically at bootup. If your system includes SCSI disk drives or other devices that support SCAM, you do not need to manually assign SCSI IDs to these devices. To enable SCAM support, see *Configuring the Host Adapter* on page 2-2.

Most SCSI devices currently in use, however, do not support SCAM. The SCSI IDs on these devices must be set manually. To change the SCSI IDs on these devices, refer to the device's documentation.



Note: If you plan to boot your computer from a SCSI device attached to the AHA-2940Ultra/2940Ultra Wide, set the Boot Target ID setting in the SCSISelect utility to correspond to the SCSI ID of the device you are booting from (see *Configuring the Host Adapter* on page 2-2).

If you install more than one SCSI host adapter in the computer, each adapter forms a separate SCSI bus. SCSI IDs can be reused as long as the ID is assigned to a device on a separate SCSI bus (e.g., each SCSI bus can have a device with SCSI ID 0).

SCSI Terminators

To ensure reliable communication, the SCSI bus must be properly terminated. Termination is controlled by a set of electrical resistors, called *terminators*. Terminators must be placed (or enabled) at the two extreme ends of the SCSI bus. All devices that lie between the ends must have their terminators removed (or disabled).

Terminating the AHA-2940Ultra

Termination on the AHA-2940Ultra itself is controlled by software commands via the SCSISelect utility. The default setting is *Automatic*, which works like this:

- If the AHA-2940Ultra detects that a cable is connected to either its internal or external SCSI connector, then it enables its terminators (the AHA-2940Ultra is at the end of the SCSI bus).
- If the AHA-2940Ultra detects that a cable is connected to both its internal and external SCSI connector, then it disables its terminators (the AHA-2940Ultra lies between the ends of the SCSI bus).

We recommend that you leave the AHA-2940Ultra set to its default setting of *Automatic*. If you want to manually enable or disable the AHA-2940Ultra termination setting, see *Configuring the Host Adapter* on page 2-2. Figure 1-3 shows termination examples for the AHA-2940Ultra.

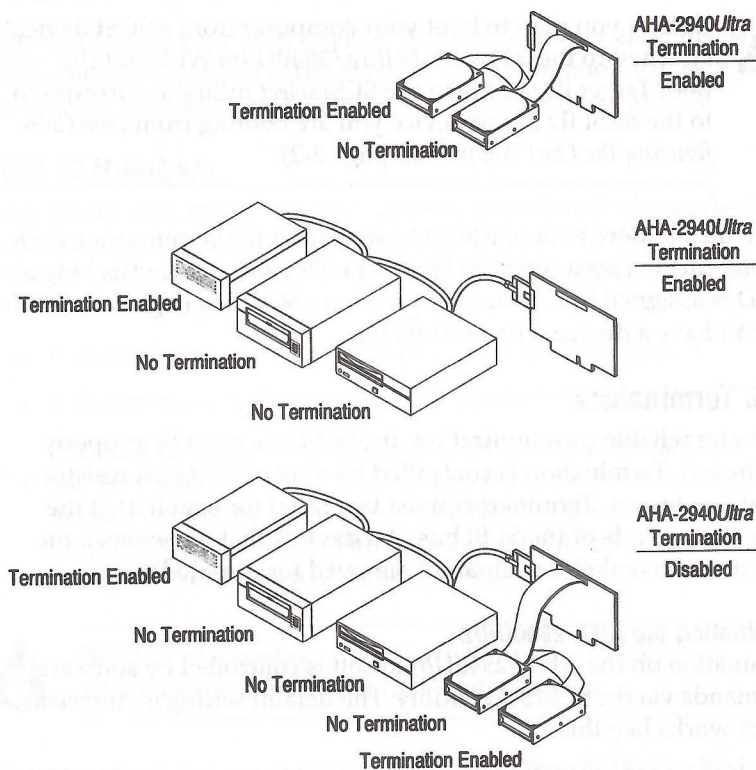


Figure 1-3. AHA-2940Ultra Termination Examples

Terminating the AHA-2940Ultra Wide

Termination on the AHA-2940Ultra Wide itself is controlled by software commands via the SCSISelect utility. The default setting is set to *Automatic*. When set to *Automatic*, if the AHA-2940Ultra Wide detects that SCSI cables are connected to any of its three SCSI connectors, it automatically sets the termination setting for the low and high bytes of the 16-bit Wide SCSI bus. The low byte controls 8-bit SCSI; the low and high bytes together control 16-bit Wide SCSI.

We recommend that you leave the AHA-2940Ultra Wide set to its default setting of *Automatic*. If you want to manually set the AHA-2940Ultra Wide termination setting, see *Configuring the Host Adapter* on page 2-2. The following table lists the termination configurations. Figures 1-4 and 1-5 show termination examples for the AHA-2940Ultra Wide.

AHA-2940Ultra Wide Termination		
Devices Connected to AHA-2940Ultra Wide	Low	High
68-pin internal connector only	ON	ON
68-pin external connector only	ON	ON
68-pin internal and 68-pin external connectors	OFF	OFF
50-pin internal connector only	ON	ON
50-pin and 68-pin internal connectors	OFF	ON
50-pin internal and 68-pin external connectors	OFF	ON

Caution: Do not connect SCSI devices to all three connectors of an AHA-2940Ultra Wide host adapter!

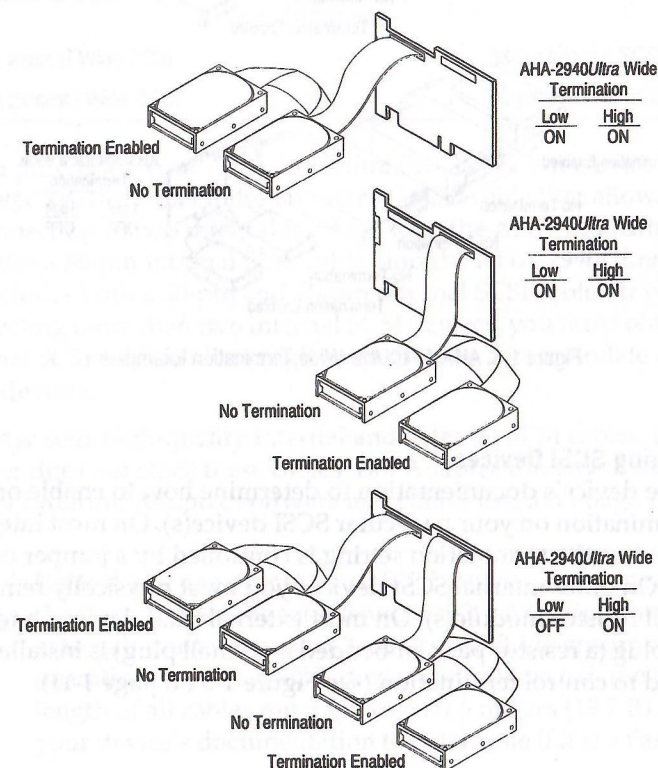


Figure 1-4. AHA-2940Ultra Wide Termination Examples

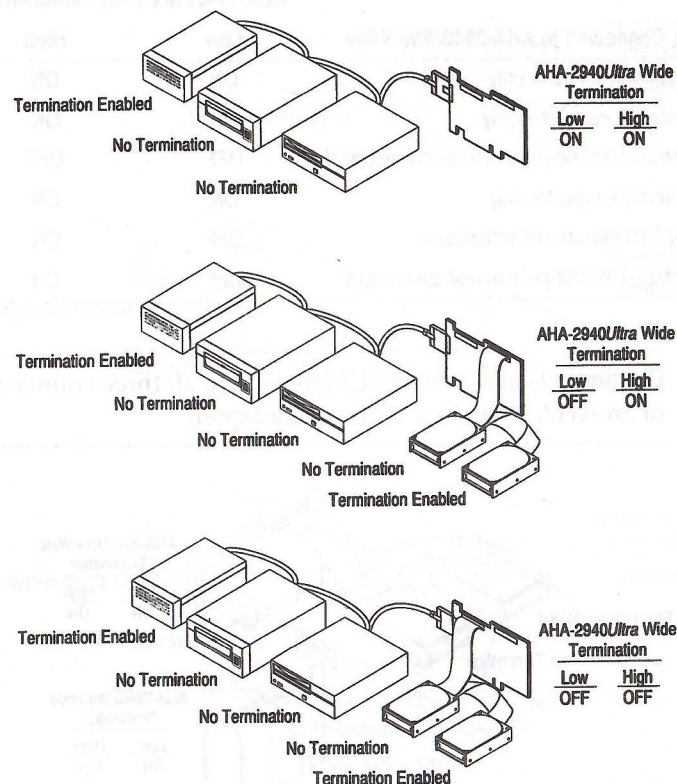


Figure 1-5. AHA-2940Ultra Wide Termination Examples

Terminating SCSI Devices

Read the device's documentation to determine how to enable or disable termination on your particular SCSI device(s). On most internal SCSI devices the termination setting is controlled by a jumper or a switch. On other internal SCSI devices you must physically remove or install resistor module(s). On most external SCSI devices, a terminating plug (a resistor pack embedded in a small plug) is installed or removed to control termination (see Figure 1-6 on page 1-11).

Installing SCSI Devices

You can connect up to a total of seven internal and external 8-bit (standard) SCSI devices to the AHA-2940Ultra, and up to 15 devices (seven standard internal and eight Wide (16-bit) internal or external SCSI devices, or 15 Wide internal and external SCSI devices) to the AHA-2940Ultra Wide.

Choosing SCSI Cables

The cables required to connect SCSI devices are determined by the type of devices you are installing, as described in the following table.

SCSI Device Type	AHA-2940Ultra	AHA-2940Ultra Wide
8-bit Internal SCSI	50-pin internal SCSI cable	50-pin internal SCSI cable
8-bit External SCSI	50-pin high-density external SCSI cable	—
16-bit Internal Wide SCSI	—	68-pin internal SCSI cable
16-bit External Wide SCSI	—	68-pin external SCSI cable

If you purchased your AHA-2940Ultra/2940Ultra Wide in an Adaptec kit, the kit includes an internal SCSI cable that allows you to connect up to two internal SCSI devices (the AHA-2940Ultra kit includes a 50-pin internal SCSI cable, and the AHA-2940Ultra Wide kit includes both a 50-pin and 68-pin internal SCSI cable). If you are connecting more than two internal SCSI devices, you must obtain an internal SCSI cable with enough connectors to accommodate all of your devices.

Adaptec sells high-quality internal and external SCSI cables. If your reseller does not stock these cables, call Adaptec directly at the number for ordering Adaptec software and cables listed on page A-4.



Note: When one or more Fast SCSI devices are connected to the host adapter, the total length of all cables (internal and external) must not exceed 3 meters (9.8 ft.) to ensure reliable operation. If no Fast SCSI devices are connected, the total length of all cables must not exceed 6 meters (19.7 ft.). See your device's documentation to determine if it is a Fast SCSI device.

Connecting Internal SCSI Devices

If you are connecting internal SCSI devices, make sure you have an internal SCSI cable with enough connectors to accommodate all of your devices.

- 1 Prepare each SCSI device for installation; configure the device SCSI ID and terminators (terminate the last internal device attached to the cable). For instructions, see the device's documentation as well as *SCSI Configuration Guidelines* on page 1-4.
- 2 Install the SCSI device in your computer. Refer to your computer and device documentation for instructions.
- 3 Plug the connector at one end of the internal SCSI cable into the host adapter's internal SCSI connector.

Make sure the colored stripe on one side of the cable is aligned with pin-1 of the host adapter's connector. Pin-1 of the connector is usually designated by a small triangle (Δ), or a "1" on the connector.

- 4 Plug the remaining connectors on the cable into the connectors on the backs of the devices.

Make sure the colored stripe on the cable is aligned with pin-1 of the device's connector.

- 5 Connect a DC power cable (from your computer's power supply) to the power connector on the SCSI device.

Connecting External SCSI Devices

If you are connecting external SCSI devices to your host adapter, you must obtain an external SCSI cable for each external device you install.

- 1 Prepare each SCSI device for installation; configure the SCSI ID and attach a terminating plug into the last external device. For instructions, see the device's documentation as well as *SCSI Configuration Guidelines* on page 1-4.
- 2 Plug the connector at one end of the external SCSI cable into the host adapter's external SCSI connector.
- 3 Plug the connector at the other end of the cable to either one of the SCSI connectors on the external SCSI device.
- 4 To connect other external SCSI devices, daisy-chain each device to the previous device until all external SCSI devices have been connected (see Figure 1-6).

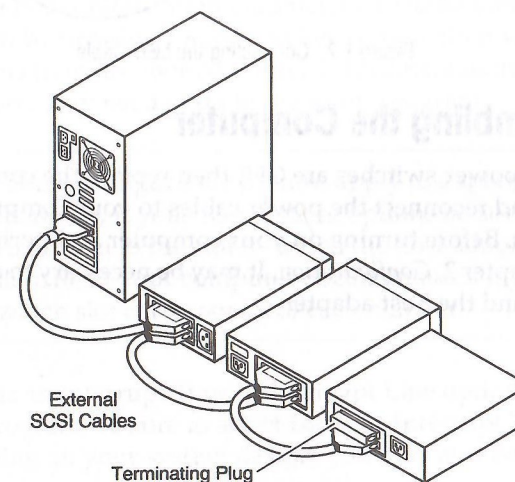


Figure 1-6. Daisy-chaining External SCSI Devices

Using the LED Connector

(Optional) Most computers have an LED disk activity light on the front panel. If you disconnect the cable from the LED connector on the motherboard and connect it to the LED connector on the host adapter (see Figure 1-7), the LED on the front panel of the computer will light whenever there is activity on the SCSI bus.

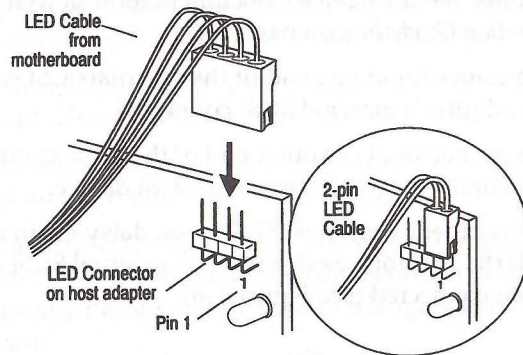


Figure 1-7. Connecting the LED Cable

Reassembling the Computer

Be sure all power switches are OFF, then replace the computer chassis cover and reconnect the power cables to your computer and peripherals. Before turning on your computer and peripherals, review, Chapter 2, *Configuration*. It may be necessary to configure the computer and the host adapter.



2

Configuration

Configuring the Computer

If your computer does not recognize the host adapter after you install it (e.g, you receive an error message, or you cannot access any of the attached SCSI devices), run the computer's setup program and check the PCI configuration parameters. Usually you start the setup program by pressing a specified key combination when your computer boots (refer to your computer's documentation.) Here are some things you may need to do in the setup program.



Note: Some configuration options apply to a specific PCI bus slot; therefore, if you change these options be sure you are applying them to the slot in which the host adapter is installed. Read your computer documentation if you are not sure which slot corresponds to each number.

- If there is an Interrupt Type or Interrupt Line option in the setup program, be sure to select **Int-A** or **Interrupt Type = A**. Depending on your system design, you may also be required to change a motherboard jumper setting.
- If there is a Triggering Interrupt option, be sure to select **Level**.
- If there is an option to enable or disable bus mastering for the PCI slots, be sure to select **Enabled**.
- If there is an option to enable or disable individual PCI slots, be sure the slot in which you install the host adapter is enabled.

- If your computer has a combination of ISA (or EISA) boards and PCI boards, you may need to mark the IRQs used by ISA/EISA boards as *Used* so the system BIOS will not try to assign these IRQs to other PCI boards.
- In some systems the BIOS reserves a set of available IRQs for PCI boards, and you have to assign these IRQs manually.

Configuring the Host Adapter

The AHA-2940Ultra/2940Ultra Wide includes the onboard, menu-driven SCSISelect configuration utility, which allows you to change host adapter settings without opening the computer or handling the board. SCSISelect also contains SCSI disk utilities that let you low-level format or verify the disk media of your SCSI hard disk drives.

SCSISelect Default Settings

The AHA-2940Ultra/2940Ultra Wide has the default settings shown in the table on the following page. The default settings are appropriate for most PCI systems. If you do not need to change any of the default settings, there is no need to run SCSISelect. Your host adapter is ready for operation and you can proceed to *Installing Device Drivers* on page 2-11.

For situations where you might want or need to change the settings, see the descriptions of each setting in the following sections. If you need to change any of the default settings, or if you would like to format or verify a disk, see *Starting the SCSISelect Utility* on page 2-10 to start the utility.

Basic Host Adapter Settings	Default
Host Adapter SCSI ID	7
SCSI Parity Checking	Enabled
Host Adapter SCSI Termination	Automatic
Boot Device Settings	Default
Boot Target ID	0
Boot LUN Number ¹	0
SCSI Device Settings	Default
Initiate Sync Negotiation	Yes (Enabled)
Initiate Wide Negotiation ²	Yes (Enabled)
Maximum Sync Transfer Rate	10 MBytes/sec ³ ; 20 MBytes/sec ²
Enable Disconnection	Yes (Enabled)
Send Start Unit Command ⁴	No (Disabled)
Advanced Host Adapter Settings	Default
Plug and Play SCAM Support	Disabled
Host Adapter BIOS	Enabled
Support Removable Disks Under BIOS as Fixed Disks ⁴	Boot only
Extended BIOS Translation for DOS Drives > 1 GByte ⁴	Enabled
Display <Ctrl-A> Message During BIOS Initialization ⁴	Enabled
Multiple LUN Support ⁴	Disabled
BIOS Support for More Than 2 Drives ⁴	Enabled
BIOS Support for Bootable CD-ROM ⁴	Enabled
BIOS Support for Int 13 Extensions ⁴	Enabled
Support for Ultra SCSI Speed	Disabled

¹ Setting is valid only if Multiple LUN Support is enabled.

² For AHA-2940Ultra Wide only

³ For AHA-2940Ultra only

⁴ Settings are valid only if host adapter BIOS is enabled.

Basic Host Adapter Settings

The basic host adapter settings are the SCSISelect settings most likely to require any modification.

- **Host Adapter SCSI ID**— This option sets the host adapter's SCSI ID. The default setting is SCSI ID 7, which give the host adapter the highest priority on the SCSI bus (see *SCSI ID Numbers* on page 1-4). We recommend that you leave the host adapter set to SCSI ID 7.

- **SCSI Parity Checking**—This option determines whether the host adapter verifies the accuracy of data transfer on the SCSI bus. The default setting is *Enabled*. You should disable SCSI Parity Checking if any SCSI device connected to the AHA-2940Ultra/2940Ultra Wide does not support SCSI parity; otherwise, leave it enabled. Most SCSI devices do support SCSI parity. If you are not sure whether a device supports SCSI parity, consult the documentation for the device.
- **Host Adapter SCSI Termination**—This option sets termination on the host adapter. The default setting for the AHA-2940Ultra/2940Ultra Wide is *Automatic*. We recommend that you leave the AHA-2940Ultra/2940Ultra Wide set to its default setting of *Automatic*. If you want to manually set the termination setting, see *SCSI Terminators* on page 1-5 for appropriate settings.

Boot Device Settings

The boot device settings allow you to specify the device you wish to boot your computer from.

- **Boot Target ID**—This option specifies the SCSI ID of the device you wish to boot from. The default setting is SCSI ID 0. The SCSI ID selected here must correspond to the ID configured on the boot device (see *SCSI ID Numbers* on page 1-4).
- **Boot LUN Number**—If your boot device has multiple LUNs (Logical Unit Numbers) and Multiple LUN Support is enabled (see *Advanced Host Adapter Settings* on page 2-7), this option allows you to specify which LUN to boot from on your boot device. The default settings is LUN 0.

SCSI Device Settings

The SCSI device settings allow you to configure certain parameters for each device on the SCSI bus. To configure a specific device, you must know the SCSI ID assigned to that device. If you are not sure of the SCSI ID, see *Using the SCSI Disk Utilities* on page 2-10.

- **Initiate Sync Negotiation**—This option determines whether synchronous data transfer negotiation (Sync Negotiation) between the device and host adapter is initiated by the host adapter. The default setting is *Yes*.

Synchronous negotiation is a SCSI feature that allows the host adapter and its attached SCSI devices to transfer data in

synchronous mode. Synchronous data transfer is faster than asynchronous data transfer.

The host adapter always responds to Sync Negotiation if the SCSI device initiates it. If neither the host adapter nor the SCSI device initiate Sync Negotiation, data is transferred asynchronously.

Normally, you should leave the Initiate Sync Negotiation setting enabled, because most SCSI devices support synchronous negotiation and because it allows for faster data transfer.



Note: Some older SCSI-1 devices do not support Sync Negotiation. This may cause your computer to operate erratically or hang if Initiate Sync Negotiation is set to *yes*. Set Initiate Sync Negotiation to *No* for these devices.

- **Initiate Wide Negotiation**—(AHA-2940Ultra Wide only) This option determines whether the host adapter attempts 16-bit data transfer (Wide negotiation) instead of 8-bit data transfer. The default setting is *Yes*.



Note: Some 8-bit SCSI devices may have trouble handling Wide negotiation, which may result in erratic behavior or a hang condition. For these devices, set Initiate Wide Negotiation to *No*.

When set to *Yes*, the host adapter attempts 16-bit transfer. When set to *No*, 8-bit data transfer is used unless the SCSI device itself requests Wide negotiation. The effective transfer rate is doubled when 16-bit data transfer is used because the data path for Wide SCSI is twice the size of *normal* 8-bit SCSI. For example, a transfer rate of 10 MBytes/sec becomes 20 MBytes/sec, and a transfer rate of 20 MBytes/sec (*UltraSCSI*) becomes 40 MBytes/sec.

- **Maximum Sync Transfer Rate**—This option sets the maximum synchronous data transfer rate that the host adapter supports. The default setting for the AHA-2940Ultra is 10.0, and 20.0 for the AHA-2940Ultra Wide.

The host adapter supports rates up to the *UltraSCSI* maximum of 20.0 MBytes/sec (the AHA-2940Ultra Wide provides an effective maximum synchronous transfer rate of 40.0 MBytes/sec). If your device is an *UltraSCSI* device, you can use the maximum value of 20.0. If your device is not an *UltraSCSI* device select a transfer rate of 10.0.

If the host adapter is set *not* to negotiate for synchronous data transfer (that is, Initiate Sync Negotiation is set to no), then the maximum synchronous transfer rate is the maximum rate that the host adapter accepts from the device during negotiation. (This is standard SCSI protocol.)

- **Enable Disconnection**—This option determines whether the host adapter allows the SCSI device to disconnect from the SCSI bus (sometimes called Disconnect/Reconnect). Enabling disconnection allows the host adapter to perform other operations on the SCSI bus while the SCSI device is temporarily disconnected. The default setting is *Yes*.

You should leave Enable Disconnection set to yes if two or more SCSI devices are connected to the host adapter. This optimizes SCSI bus performance. If only one SCSI device is connected to the host adapter, set Enable Disconnection to *No* to achieve slightly better performance.

- **Send Start Unit Command**—This option determines whether the Start Unit Command is sent to the SCSI device at bootup (most devices do not require this). The default setting is *No*.

Setting this option to yes reduces the load on your computer's power supply by allowing the host adapter to start SCSI devices one-at-a-time when you boot your computer. When set to no, the devices are allowed to start at the same time. Most devices require you to set a jumper before they can respond to this command.



Note: If the Send Start Unit Command is set to yes for many devices, the boot time will vary depending how long it takes each drive to start.

Advanced Host Adapter Settings

The advanced host adapter settings should not be changed unless absolutely necessary.

- **Plug and Play SCAM Support**—This option determines whether the AHA-2940Ultra/2940Ultra Wide automatically assigns SCSI IDs to attached SCSI Devices that support the SCAM protocol (see *SCSI ID Numbers* on page 1-4). The default setting is *Disabled*.

Most non-SCAM devices tolerate SCAM protocol, so you can enable this option even for non-SCAM devices. In rare cases, an old SCSI-1 device may not tolerate SCAM and may cause the computer to hang or operate erratically. If this happens, disable this option.

- **Host Adapter BIOS**—This option enables or disables the host adapter BIOS. The default setting is *Enabled*.



Note: Several *SCSISelect* options are not valid unless the host adapter BIOS is enabled. The table on page 2-3 identifies these options.

If you are booting from a SCSI disk drive connected to the host adapter, the BIOS must be enabled. You should disable the host adapter BIOS if the peripherals on the SCSI bus (for example, CD-ROM drives) are all controlled by device drivers and do not need the BIOS.

- **Support Removable Disks Under BIOS as Fixed Disks**—This option controls which removable-media drives are supported by the host adapter BIOS. The default setting is *Boot Only*. The following choices are available:
 - **Boot Only**—Only the removable-media drive designated as the boot device is treated as a hard disk drive.
 - **All Disks**—All removable-media drives supported by the BIOS are treated as hard disk drives.
 - **Disabled**—No removable-media drives are treated as hard disk drives. In this situation, software drivers are needed because the drives are not controlled by the BIOS.



Caution: If a removable-media SCSI device is controlled by the host adapter BIOS, *do not* remove the media while the drive is on or you may lose data! If you want to be able to remove media while the drive is on, install your removable-media device driver and set this option to **Disabled**.

- **Extended BIOS Translation for DOS Drives > 1 GByte**—This option determines whether extended translation is available for SCSI hard disks with capacities greater than 1 GByte. The default setting is *Enabled*.



Caution: If you decide to change the translation scheme, back up your disk drives first! All data is erased when you change from one translation scheme to another.

The standard translation scheme for SCSI host adapters provides a maximum accessible capacity of 1 GByte. To support disk drives larger than 1 GByte, the AHA-2940Ultra/2940Ultra Wide includes an extended translation scheme. This scheme supports disk drives as large as 8 GBytes under MS-DOS with a maximum partition size of 2 GBytes.

Extended BIOS Translation is used only with MS-DOS 5.0 or above. You do not need to enable this option if you are using another operating system such as NetWare, OS/2, Windows NT, or UNIX.

When you partition a disk larger than 1 GByte, use the MS-DOS *fdisk* utility as you normally would. Because the cylinder size increases to 8 MBytes under extended translation, the partition size you choose must be a multiple of 8 MBytes. If you request a size that is not a multiple of 8 MBytes, *fdisk* rounds up to the nearest whole multiple of 8 MBytes.

- **Display <Ctrl-A> Message During BIOS Initialization**—This option determines whether the Press <Ctrl> <A> for SCSISelect (TM) Utility! message appears on your screen during system bootup. The default setting is *Enabled*. If this setting is disabled, you can still invoke the SCSISelect utility by pressing <Ctrl><A> after the host adapter BIOS banner appears.
- **Multiple LUN Support**—This option determines whether booting from a SCSI device that has multiple LUNs is supported. The default setting is *Disabled*. Enable this option if your boot device has multiple LUNs.
- **BIOS Support for More Than 2 Drives**—This option determines whether the host adapter BIOS provides support for more than two, and up to eight, hard disk drives. This feature is supported by DOS 5.0 and above. The default setting is *Enabled*.

DOS systems can support up to a total of eight SCSI and non-SCSI disk drives. Here are some example of possible disk drive configurations, if the BIOS Support for More Than 2 Drives option is enabled:
 - If two IDE drives are installed on your computer's hard disk drive controller, you can install up to six SCSI drives (supported by the BIOS) on the host adapter, making a total of eight drives.
 - If one IDE drive is installed on your computer's hard disk drive controller, you can install up to seven SCSI drives (supported by the BIOS) on the host adapter.
- **BIOS Support for Bootable CD-ROM**—This option determines whether the host adapter BIOS provides support for booting from a CD-ROM drive. The default setting is *Enabled*.
- **BIOS Support for Int 13 Extensions**—This option determines whether the host adapter BIOS supports disks with more than 1024 cylinders. The default setting is *Enabled*.
- **Support for Ultra SCSI Speed**—This option determines whether the host adapter supports the fast transfer rates (13.4, 16, 20.0) of Ultra SCSI devices. The default setting is *Disabled*.

Starting the SCSISelect Utility

You can start the SCSISelect utility by pressing **Ctrl-A** when the following prompt appears briefly at boot time:

Press <Ctrl><A> for SCSISelect (TM) Utility!

The first menu that appears displays the options Configure/View Host Adapter Settings and SCSI Disk Utilities.

Using SCSISelect Menus

SCSISelect uses menus to list options you can select. To select an option, use the **↑** and **↓** keys to move the cursor to the option, then press **Enter**.

In some cases, selecting an option displays another menu. You can return to the previous menu at any time by pressing **Esc**. To restore the original SCSISelect default values, press **F6**. To toggle the display between color and monochrome modes, press **F5** (this feature may not work on some kinds of monitors).

Exiting SCSISelect

To exit SCSISelect, press **Esc** until a message prompts you to exit (if you changed any AHA-2940Ultra/2940Ultra Wide settings, you are prompted to save the changes before you exit). At the prompt, select **Yes** to exit, then press any key to reboot the computer. Any changes you made in SCSISelect take effect after the computer boots.

Using the SCSI Disk Utilities

To access the SCSI disk utilities, select the SCSI Disk Utilities option from the menu that appears after starting SCSISelect. Once the option is selected, SCSISelect immediately scans the SCSI bus (to determine the devices installed) and displays a list of all SCSI IDs and the devices assigned to each ID.

When you select a specific ID and device, a small menu appears, displaying the options Format Disk and Verify Disk Media.

- **Format Disk**—This utility allows you to perform a low-level format on a hard disk drive. Most SCSI disk devices are preformatted at the factory and do not need to be formatted again. The Adaptec Format Disk utility is compatible with the vast majority of SCSI disk drives.



Caution: A low-level format destroys all data on the drive. Be sure to back up your data before performing this operation. You *cannot* abort a low-level format once it is started.

- **Verify Disk Media**—This utility allows you to scan the media of a hard disk drive for defects. If the utility finds bad blocks on the media, it prompts you to reassign them; if you select **yes**, those blocks are no longer used. You can press **Esc** at any time to abort the utility.

Installing Device Drivers

Some operating systems embed (include) the AHA-2940Ultra/2940Ultra Wide device driver as part of their installation software. These drivers work fine with your AHA-2940Ultra/2940Ultra Wide; however, the most recent version of the driver should be installed in order for your AHA-2940Ultra/2940Ultra Wide to perform at its optimum level.

If you purchased your AHA-2940Ultra/2940Ultra Wide in a kit, the kit includes the latest Adaptec EZ-SCSI and Adaptec 7800 Family Manager Set software.

- **Adaptec EZ-SCSI**—allows you to install software drivers for DOS/Windows 3.x and several additional utilities. Refer to the *EZ-SCSI User's Guide*.
- **Adaptec 7800 Family Manager Set**—allows you to install software drivers for NetWare, OS/2, Windows 95, Windows NT, and UNIX. Refer to the *7800 Family Manager Set User's Guide*.

If you need to order EZ-SCSI or the 7800 Family Manager Set, call the number for ordering Adaptec software and cables listed on page A-4.



Advanced Setups and Configurations

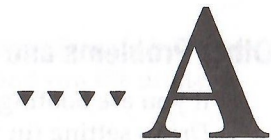
Configuring Multiple Host Adapters

Multiple AHA-2940Ultra/2940Ultra Wide host adapters can be installed in your computer; you are limited only by the number of available PCI bus slots (installation and setup is the same as a single AHA-2940Ultra/2940Ultra Wide). Each host adapter you install forms a separate SCSI bus with a different set of SCSI devices.

In computers with multiple host adapters, consider the following:

- If you are booting from the AHA-2940Ultra/2940Ultra Wide, you may have to install the boot host adapter in the lowest numbered PCI bus slot. (Most IBM and Intel based PCI systems do not have this requirement.) Refer to your system documentation to determine the PCI bus slot number.
- If you have two AHA-2940Ultra/2940Ultra Wide host adapters and each has a boot device connected, the computer boots from the host adapter in the lowest numbered PCI bus slot. If you want to select a specific host adapter to boot from, enable the BIOS only on that host adapter.
- If you are booting from the AHA-2940Ultra/2940Ultra Wide and you also have an ISA/EISA-based host adapter installed, you must disable the BIOS on the ISA/EISA-based host adapter.

- If you are booting from an ISA/EISA-based host adapter and you also have an AHA-2940Ultra/2940Ultra Wide installed with a boot device connected, the ISA/EISA-based host adapter will boot before the AHA-2940Ultra/2940Ultra Wide.
- When running the SCSISelect utility, if the utility finds multiple AHA-2940Ultra/2940Ultra Wide host adapters in your computer, it displays the PCI bus number and PCI device number of each host adapter. To determine which of the host adapters SCSISelect is configuring, view the red LEDs on the host adapters as you move the highlight bar to different host adapters with the ↑ and ↓ keys. (The computer cover must be removed to view the LEDs.)



Need Assistance?

Troubleshooting

Most problems that occur with your host adapter result from errors in preparing and connecting devices on the SCSI bus. If you have problems when using your host adapter, check these items first.

- Are all SCSI devices powered?
- Are all SCSI bus cables and power cables properly connected?
- Is the host adapter firmly seated and secured in a PCI slot that is capable of bus mastering?
- Is pin-1 orientation maintained throughout the SCSI bus? (See *Connecting Internal SCSI Devices* on page 1-10.)
- Does the host adapter and all devices on the SCSI bus have unique SCSI IDs? (See *SCSI ID Numbers* on page 1-4.)
- Are all devices on the SCSI bus terminated properly? (See *SCSI Terminators* on page 1-5.)
- Are the PCI configuration parameters set correctly in your computer's setup program? (See *Configuring the Computer* on page 2-1.)
- Is parity checking consistently enabled or disabled on all devices on the SCSI bus? (See *Basic Host Adapter Settings* on page 2-3.)

If your problems persist, continue with the following sections.

Other Problems and Solutions

- If you are booting from a SCSI hard disk drive, make sure the *Drives* setting (in your computer's setup program) that corresponds to the drive is set to **None** or **No Drives Installed**, as is required for SCSI hard disk drives. (See your computer documentation.)



Note: If both SCSI and non-SCSI (e.g., IDE) disk drives are installed, then the non-SCSI disk drive is always the boot device.

- If you changed any values on a host adapter, in a setup program, or on a SCSI device, did you turn the power OFF and ON to ensure that the new values are loaded?
- If you tried to use the format/verify utility on a disk device and got an Unexpected SCSI Command Failure pop-up box with error information, the utility probably encountered a problem with the disk device or the media and therefore cannot run.

You can probably determine from the Sense Key information (e.g., 06h - Unit Attention) both the cause of the problem and its solution. Here are some of the more common Sense Key values and their meanings:

- 02h - Not ready—The media is not ready to format. Be sure that media is inserted in the drive and that the media is spun up.
- 03h - Medium error—The disk media may be defective. If it is a removable-media drive, try using a different disk media. If it is a fixed disk drive, the disk may be physically damaged. Verify and format the media with *SCSISelect*.
- 04h - Hardware error—The disk drive may be defective. Consult the hardware documentation and contact the manufacturer.
- 05h - Illegal request—The Adaptec formatting utility does not support a low-level format of this device; however, the device may already be low-level formatted by the manufacturer. (This error rarely occurs.)

- 06h - Unit attention—The removable media may be write-protected. Disable write protection and run the utility again.

BIOS Startup Messages

If the host adapter BIOS is enabled, but it fails to initialize, the system displays a specific error message followed by a BIOS Installation Failure message. Here are some of these error messages and their meaning:

Device connected, but not ready.

The host adapter received no answer when it requested data from an installed SCSI device. Try setting the Send Start Unit Command to **yes** for the host adapter. (See *SCSI Device Settings* on page 2-4.)

If the message still appears, follow the drive manufacturer's instructions to make sure the drive is set to spin up when the power is switched ON.

Start unit request failed.

The BIOS was unable to send a Start Unit Command to the device. Run the *SCSISelect* utility and disable Send Start Unit Command for the device.

Time-out failure during ...

An unexpected time-out occurred. Check SCSI bus termination. Try disconnecting the SCSI peripheral cables from the host adapter and then starting the computer. If the computer successfully restarts, check SCSI bus termination and cable connections. One of the devices on the SCSI bus may be defective.

Adaptec Customer Support

If you have questions about installing or using your Adaptec product, check this user's guide first—you will find answers to most of your questions here. If you need further assistance, please contact us. We offer the following support and information services.

- For technical support (answers to technical questions, information about the Adaptec BBS, FTP and WWW Servers, and access to the Interactive Fax system), call 800-959-SCSI (7274) or 408-945-2550, 24 hours a day, 7 days a week. To speak with a product support representative, call 408-934-SCSI (7274), M–F: 6:00 a.m. to 5:00 p.m., Pacific Time; after these hours, on weekends, and on holidays, product support is also available for a fee at 800-416-8066.
- To order Adaptec software and SCSI cables, call 800-442-SCSI (7274) or 408-957-SCSI (7274), M–F: 6:00 a.m. to 5:00 p.m., Pacific Time.
- The Adaptec Electronic Bulletin Board Service (BBS) provides information on software upgrades, answers to common questions, and other topics. The BBS is available 24 hours a day, 7 days a week, at 408-945-7727; 1200/2400/9600/14,400/28,800 baud, 8 data bits, 1 stop bit, no parity.
- The Adaptec FTP and WWW Servers provide information on software upgrades, product literature, answers to common questions, and other topics. The FTP and WWW Servers are available from the Internet 24 hours a day, 7 days a week, at [ftp.adaptec.com](ftp://ftp.adaptec.com) and <http://www.adaptec.com>.
- The Adaptec Interactive Fax system provides answers to common questions, product literature, and current information about Adaptec products and services. The Adaptec Interactive Fax system is available 23 hours a day, 7 days a week. The Fax system is out of service 1 hour each day. You can call this service directly at 408-957-7150.
- To request additional documentation for Adaptec products, call 800-934-2766 or 510-732-3829, M–F: 6:00 a.m. to 5:00 p.m., Pacific Time.



▼▼▼▼ Index

A

Adaptec 7800 Family Manager Set 2-11
 Adaptec customer support A-4
 Adaptec EZ-SCSI 2-11
 Advanced host adapter settings 2-3, 2-7
 Advanced setups and configurations 3-1
 Auto-termination 1-5

B

Basic host adapter settings 2-3
 BBS A-4
 BIOS 1-2, 2-3, 2-7
 startup messages A-3
 support for bootable CD-ROM 2-3, 2-9
 support for Int 13 extensions 2-3, 2-9
 support for more than 2 drives 2-9
 support for multiple drives 2-3
 Board layout 1-2
 Boot device 1-5, 2-3, 2-4
 Boot LUN number 2-3, 2-4
 Boot target ID 1-5, 2-3, 2-4
 Bootable CD-ROM 2-3, 2-9
 Booting
 displaying Ctrl-A message 2-3
 from a CD-ROM drive 2-3
 from a non-SCSI device 3-2
 from a SCSI device 1-5, 3-1, A-2
 Bus Master 1-3, 2-1, A-1

C

Cables 1-9, 1-10, 1-11
 CD-ROM 1-1, 2-3, 2-9
 CMOS setup program 2-1
 Components 1-2
 Configuration
 configuring the computer 2-1
 configuring the host adapter 2-2
 guidelines 1-4
 multiple host adapters 3-1
 PCI configuration parameters 2-1, A-1
 Connectors 1-2
 Ctrl-A message 2-9
 Customer support A-4

D

Daisy chain 1-11
 Default settings 2-2
 Device drivers 2-11
 Device settings 2-4
 Disconnect/Reconnect 2-3, 2-6
 Disk utilities 2-10, A-2
 low-level format 2-10
 verify disk media 2-11
 Display Ctrl-A message 2-3, 2-9
 DOS support 2-11
 Drives greater than 1 GByte 2-3, 2-8

E

Enable disconnection 2-3, 2-6
 Expansion slot 1-3, 3-1, A-1
 Extended BIOS translation 2-3, 2-8

F

Fast SCSI devices 1-9, 2-6
 Fax A-4
 Fdisk utility 2-8
 FTP server A-4

H

Hard disk drive 1-1
 Host adapter
 advanced settings 2-3, 2-7
 basic settings 2-3
 BIOS 2-3, 2-7
 components 1-2
 layout 1-2
 SCSI ID 2-3
 termination 2-3, 2-4

I

Initiate synchronous negotiation 2-3, 2-4
 Initiate Wide negotiation 2-3, 2-5
 Installation 1-1
 device drivers 2-11
 external SCSI devices 1-11
 host adapter 1-3
 internal SCSI devices 1-10
 multiple drives 2-3
 SCSI devices 1-4, 1-9
 Int 13 extensions 2-3, 2-9
 Interactive fax A-4
 Interrupt channel 2-1
 IRQ 2-1

L

LED cable 1-12
 LED connector 1-12
 Logical Unit Number
 see LUN
 LUN 2-3, 2-4, 2-9

M

Maximum synchronous transfer rate 2-3, 2-5
 Messages A-3
 Multiple drives 2-9
 Multiple host adapters 3-1
 Multiple LUN support 2-3, 2-4, 2-9

N

NetWare support 2-11

O

OS/2 support 2-11

P

Parity checking 2-3, 2-4, A-1
 PCI
 bus 1-1, 2-1, 3-1, A-1
 configuration parameters 2-1, A-1
 expansion slot 1-3, 2-1
 Pin-1 orientation 1-10, A-1
 Plug and play 2-3, 2-7
 Power cable 1-10

R

Reassembling the computer 1-12
 Removable-media drives 1-1, 2-3, 2-7

S

SCAM 1-4, 2-3, 2-7
 Scanners 1-1
 SCSI
 bus 1-5, 3-1
 cables 1-9
 configuration guidelines 1-4
 connector 1-5

device settings 2-4
 devices 1-1, 1-4
 disk utilities 2-10, A-2
 external connector 1-2
 external devices 1-9, 1-11
 Fast SCSI devices 1-9
 ID number 1-4, 1-5, 1-10, 1-11, 2-3, 2-7, 2-10, A-1
 installing devices 1-9
 internal connector 1-2
 internal devices 1-9, 1-10
 LED connector 1-2
 parity checking 2-3, 2-4, A-1
 protocol chip 1-2
 terminating plug 1-11
 terminators 1-5-1-8, 1-10, 1-11, 2-3, 2-4, A-1
 Wide SCSI 2-3, 2-5

SCSI Configured AutoMatically
 see SCAM

SCSISelect 1-1, 1-5, 2-2
 color and monochrome modes 2-10
 configuring multiple host adapters 3-2
 default settings 2-2
 displaying a list of SCSI IDs 2-10
 how to exit 2-10
 how to start 2-10
 restoring default values 2-10
 using menus 2-10
 Send start unit command 2-3, 2-6
 Sense key information A-2
 Startup messages A-3
 Synchronous data transfer 2-3, 2-4, 2-5
 Synchronous negotiation 2-3, 2-4

T

Tape backup 1-1
 Technical support A-4
 Terminating plug 1-11

Terminators
 see SCSI terminators

Transfer rate 2-3, 2-5

Troubleshooting A-1-A-3

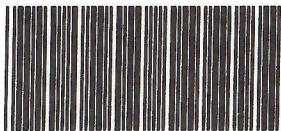
U

UNIX support 2-11

W

Wide SCSI 2-3, 2-5
 Windows NT support 2-11
 Windows support 2-11
 WWW server A-4





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